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ABSTRACT

As part of a language arts series for kindergarten through grade nine, this ninth grade guide examines environmental values, concepts, and problems according to a common conceptual scheme: all living things, including humans, are interrelated and interdependent; heredity and environment interact to determine the characteristics of an organism and therefore a population; living things and environments are in a continuous state of change; the world has finite resources and almost infinite demands are made on these resources; and each individual, as an agent of change, has a responsiblity to the environment. The guide offers a series of environmental activities that stress the development of reading, writing, and discussion skills and emphasize the discovery method of observation. The guide includes background information, a teacher's outline, student task sheets, and appendixes containing various types of word puzzles for the students. (MAI)

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INDIAN RIVER COUNTY

ENVIRONMENTAL EDUCATION INSTRUCTIONAL GUIDE

1975

Office of Environmental Education
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LANGUAGE ARTS

NINTH GRADE

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ENVIRONMENTAL EDUCATION

INSTRUCTIONAL GUIDE

This publication serves as the teaching nucleus for Environmental Education activities in Ninth Grade. The development of this program is a joint effort of teachers and staff of the Indian River County Schools.

This Guide was developed by: Mrs. Norva Green
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The Introduction was written by Mr. Phil Parisi - Vero Beach Elementary School

We wish to thank the Title III, E.S.E.A. Lee County Environmental Education Project as the conceptual framework for the organization of the guides comes from their work. Also, some of the activities in this guide are from their Interdisciplinary Concepts and Activities Guides.

This publication is one in a series developed by the Environmental Education Program for Indian River County Schools. This series is designed to be used by teachers, students and community members to help them to utilize community resources in developing and teaching environmental concepts, responsibility and in seeking ways to solve environmental problems. All materials are in pilot form and may be revised.

The work presented or reported herein was performed pursuant to a grant from the State Department of Education, Office of Environmental Education.

INTRODUCTION

ABOUT THE ENVIRONMENT

The environment is perhaps the most important complex of systems for man. Yet it is perhaps the most abused. It is becoming trite to say this, but none the less true--unless we change our ways, we will die.

Throughout history men have been able to change. They have done this with much pain and toil. The responsibility of this change has in the past rested on certain individual leaders. Today these leaders must reach a wide population and they must reach them at a time when habits are forming. The teachers of today are the leaders who must take up the cause of educating future populations about the delicate balance we live in.

It seems strange that many peoples of the world (American Indians, for one) need no formal or separate environmental education program for their young. Indian children grow up with the notion that the universe and the environment is one living thing. It must be respected and revered as something sacred. But somehow, modern man has lost vision of that simple concept, if indeed he ever possessed it. Environmental education is a way we can regain a respect that seems to come natural to some populations. It is a way we can be fit for survival and for prevailing on Earth.

In the year 2006, the earth will have doubled the present number of people. Within just 35 years another 3 billion people will be competing for the world's already taxed resources. This is not a problem of future generations, but an existing one that you and your students are already witnessing. As the population soars, crime rates, suicides, and psychological disorders increase at disproportional rates. More species are constantly being added to the endangered species lists, and more wilderness areas are continually being infringed upon by development. Our soil is lost at an alarming rate as it, with a heavy load of fertilizer, is being washed by rains into our precious water supplies.

INTRODUCTION

ABOUT ENVIRONMENTAL EDUCATION

There doesn't appear to be any part of this planet that is not affected by man's hand. Distributing the world's limited resources and minimizing the damage to our planet is going to be difficult. The dilemma is not going to be the problem of any one discipline area; rather, it will touch each of us, in all phases of our lives. Maintaining a quality of life will necessitate new directions in our literature, economics, psychology, food choices, engineering, and even in our daily lives.

Attaining environmental quality is everyone's responsibility, and, as such, it is going to require knowledge on the part of all our citizens. If our students are to make intelligent choices they will feel comfortable living with, they are going to need you to provide them with much of the background information they will need. Our environmental problems demand our attention in every phase of the curriculum so that our students can be prepared to solve this enigma.

Three themes or stages in educating a student to prepare him for environmental choices are: 1) awareness of the environment; 2) knowledge of the environment; and 3) action in the sense of effecting a solution.

Predicting the experiences and knowledge students will need in the future is always a difficult task. However, a few basics are readily identifiable. It seems logical to assume that a person cannot make intelligent decisions if he is not aware of the problem, or even the existence of the area that has the problem. Next, it is important that he understands or has some basic knowledge about the stressed area and the stress factors involved. Finally, once an individual is aware of a problem and has knowledge about it, he must have the tools to effect a solution for the problem.

We have targeted awarenesses at the primary and lower intermediate grades, knowledge at the upper intermediate and middle school level, and action begins in

the upper middle school running through the high school and into the adult community.

The K-9 curriculum guides compiled by various environmentalists are organized around several basic conceptual schemes that were felt to be necessary for a working knowledge of the environment. In addition,these schemes and the activities suggested for their illustration, have been applied as much as possible to the unique problems of Indian River County.

A FINAL NOTE

Education about the environment can too easily become merely an academic exercise, rather than vital interaction. Many researchers have shown that the discovery method of learning allows a more thorough and lasting attainment of the desired principles and it heightens motivation at the same time. The discovery method provides an individual experience and allows success for a wide ability range of students, because it is discovering new knowledge at each student's own particular level.

Your role in the environmental education campaign is important for the student's ability to perceive the subtleties of nature will often depend on your guidance. Most often this is not done through telling the student the names of everything he sees. We need to guide him to the relationships and beauties rather than tell him about it. The student will be eternally grateful to the teacher who helps him observe the natural wonders he encounters. He will long remember the first time he saw a beautiful bird or had someone help him closely examine a delicate wildflower. If we ask him guiding questions which lead him to make his own discoveries we are doing him the greatest service a teacher can do; we are leading the person to the knowledge about using his own brain. We are showing him how to use his capacities of reason and understanding and enjoyment.

INDIAN RIVER COUNTY RESOURCES

The Florida Division of Forestry survey of 1971 showed 44.4 thousand acres of forest land in Indian River County. This report rated the land's most valuable asset as a scenic and recreation amenity. Forestland is also a favorable modifier of the increasingly contaminated environment caused by increased population growth, urbanization, and industrialization and provides relief from crowded city living.

There are five forest types. They are listed here from largest acreage to smallest.

1. Pine flatwoods, characterized by open stand of slash pine mingled with an understory of scrub palmetto and grass.
2. Hardwood and cypress swamps--include tupelo, black gum, sweet gum, some of the oaks singly or in combination, and often associated with willow, ash, elm, water hickory and maple. The soil here is rich.
3. Sand pine scrub--found on higher, drier ridges, principally on St. Lucie sands.
4. Mixed pine hardwood--found in the transition zones along major streams and drainage between the bottomland hardwood swamps and the pine flatwoods. This is a mixture of longleaf and slash pine, associated with willow oak, live oak, sweet gum and hickory.
5. Mangrove forest--along the costal islands and tidal flats, consisting of red and black mangrove in dense thickets along partially submerged lands subject to periodic wash by high tides and brackish estuarine waters.

The importance of natural hardwood, swamps, and wetlands as a natural filter should not be overlooked. Repeated studies and experience elsewhere show that

water delivered through natural drainage tends to improve in quality through the process of self-purification as it flows through and into the forest floor--that spongy, natural filter made up of debris, leaves and partially decayed vegetative duff. Water drained out of any watershed by canal will not show the improved quality of this naturally filtered product.

Although the hardwood and cypress swamps (consisting of a little over 10,000 acres of forested land) remained largely intact in this area for many years, they have been abused by over-cutting, promiscuous burning, over-grazing, and draining, all of which detract from their usefulness as a natural filter. Since 1970 drastic reductions of the hardwood Cypress community has occurred by the drainage of large areas of marsh for citrus production.

The value of mangrove forests to the marine ecosystem is well known. According to the distinguished ecologist, Dr. E. P. Odum of the University of Georgia, this interaction of land, sea, air and sunlight provides some of the richest food-producing areas in the world--20 times as productive per unit as the open sea, seven times as productive as an alfalfa field, and twice as productive as a field of corn!! Efforts should be continued to preserve the existing mangrove along the Indian River and expand it to the barren islands capable of supporting this growth. Some preliminary efforts at seed collection and restablishment are going on here and elsewhere in the state where this problem exists.

The Pelican Island Audubon Society has listed the ten major areas of Environmental and Human Concern in Indian River County. That list follows.

Areas of Environmental and Human Concern

1. Preservation and Protection of The Indian River Estuary, Including:

    a. Red and Black Mangrove swamplands
    b. Batis (pickleweed) marsh
    c. Submerged marine grass beds
    d. Spoil Islands
    e. Marshland functions
        (1) Marine productivity
        (2) Hurricane and storm protection
        (3) Wildlife feeding and nesting habitat
        (4) Pollutant filtration
        (5) Aesthetic values

2. Water Resources

    a. Shallow well aquifer
    b. Floridan aquifer
    c. Protection of recharge areas
    d. St. Johns River headwater marshlands

3. Water Pollution Abatement

    a. Sewage treatment plants
    b. Septic tanks and drainfields
    c. Canals and ditches
    d. Lakes, ponds, borrow pits
    e. Agricultural runoff
    f. Urban runoff
    g. Public health
    h. Tertiary treatment, land-spraying
    i. Sand-mining operations

4. Solid Waste Disposal

    a. Sanitary land fills
    b. Recycling
    c. Littering

5. Dune and Beach Protection and Restoration

6. Rare and Endangered Habitats

    a. Parklands
    b. Coastal forest hammocks
    c. Sand pine community
    d. Pine-flatwood community
    e. Freshwater marsh community

7. Noise Pollution

8. Air Pollution

9. Growth and Development Impact

    a. Environmental
    b. Economic
    c. Social

10. Development of Land-Use Policies and Ethics

Endangered and Threatened Wildlife in Indian River County

Endangered - Wildlife in this category are in danger of disappearing unless steps are taken to prevent this.

Birds: Wood Stork - A wetland inhabitant in marshes and water impoundments. In recent years 100-200 pairs have been nesting annually on Pelican Island.

Florida Everglade Kite - Not more than 100-150 of these freshwater marsh inhabiting birds survive in Florida. Several pairs have been found each spring in the St. Johns Water Management District reservoir west of Vero Beach, but overdrainage of this reservoir and subsequent loss of the Apple Snail--its sole food--has caused nesting failures.

Red-cockaded Woodpecker - Less than a half dozen birds occur in Indian River County, in a strip of Slash Pine forest along the upper reaches of the Sebastian River, southwest of Roseland. This species is dependent upon pines that have a fungus disease of the heartwood in which they excavate their nesting and roosting cavities.

Mammals: Florida Panther - Possibly one or two pairs of this rare carnivore, sometimes called a puma, or cougar, remain precariously in the wilder parts of Indian River County.

Manatee - Each winter several manatees are seen in the Indian River, especially in the warmer waters of the lagoon and canal near Vista Harbors and the outfall canal of the Vero Beach power plant. They are particularly vulnerable to injury by outboard motor propellers.

Reptiles: American Crocodile - This reptile is usually found only along the coastal areas of south Florida and the keys, but a large 15-foot crocodile was found in 1974 in a pond at Vista Royale south of Vero Beach.

Atlantic Green Turtle - each year several females of this species come ashore to lay eggs on the beach.

Atlantic Saltmarsh Snake - one of the few snakes found in salt water. It is a harmless water snake and may be found inhabiting mosquito control impoundments on both sides of the Indian River.

Threatened - Wildlife not in imminent danger of extinction, but could become endangered if conditions worsen.

Birds: Brown Pelican - Indian River County probably has the largest concentration of Brown Pelicans in North America. Outside of Florida pesticides have seriously affected this species reproduction.

Magnificent Frigatebird - Occasionally seen over the Indian River and the beach and at Pelican Island. Considered threatened because its only nesting area in North America is on the Marquesas Keys near Key West.

Reddish Egret - One or two individuals are seen each year in the Indian River and at Sebastian Inlet. The last species to recover from the slaughter of the plume trade days.

Roseate Spoonbill - Several dozen or more of this species visit Indian River Cojnty during the spring and summer. Occasionally seen in larger drainage canals west of Vero Beach.

Osprey - Several breeding pairs found along the Indian River and at Blue Cypress Lake. More numerous in winter when northern birds are present.

Caracara - Only around 250 estimated to remain in Florida. One or two are sometimes seen in ranch areas in western parts of the county.

American Oystercatcher - Two, possibly three pairs nest on spoil islands in Indian River. Very intolerant of human disturbance.

Least Tern - Our smallest tern, here in summer only and often seen fishing in the surf. Dependent upon spoil islands and sand spits for nesting sites.

Florida Scrub Jay - Probably less than a dozen pairs remain in Indian River County in Sandpine-scrub oak communities near Donald MacDonald Park, Winter Beach-Gifford area along Old Dixie, and Whispering Palms area, south of Vero Beach. Dependent upon undisturbed scrub habitat.

Mammals: Florida Mouse - Found only in sandpine-scrub habitat on the Florida ridge.

Florida Beach Mouse - Although relatively common farther north, the destruction of beach dune vegetation in Indian River County has greatly reduced the numbers of this tiny, pale-brown mouse.

Round-tailed Muskrat - Found in freshwater marshes, but few remain in Indian River County because of overdrainage.

Reptiles: Gopher Tortoise - Although still frequently seen in our area, the destruction of Sandpine and Slash Pine Flatwoods habitat has greatly reduced their numbers.

Atlantic Loggerhead Turtle - Several hundred females nest each year on Indian River County beaches, but successful hatching is low because of predation by raccoons, disturbance by people and excessive beach erosion where man-made structures are too close to the beach.

TABLE OF CONTENTS

Introduction — Page

Conceptual Scheme I — 1

All living things, including man, are interrelated and, therefore, are also interdependent.

Concept A — 1

As organisms depend upon each other the transfer of physical energy is not 100% efficient. Some physical energy is lost.

Concept B — 2

In the ecosystem (the system of life) when too many species become extinct, or too many forests, marshes or mangroves are removed, or too much pollution is produced, hindering the living links, the ecosystem is made less efficient or stable, and ultimately runs the risk of breaking down.

Concept C — 5

Organisms need an effective system of communication.

Conceptual Scheme II — 6

Heredity and environment interact to determine the characteristics of an organism and, therefore, a population.

Concept A — 6

Organisms have different adaptations to meet different feeding habits.

Concept B — 7

Each organism is adapted to a specific environment and will compete with other creatures in the habitat.

Concept C — 9

Each organism is adapted to its environment in an endless variety of ways.

Concept D — 11

The diversity of species and their adaptations to survival in specific environments result in a distribution that fills almost every available habitat and area.

Concept E — 13

Each species is adapted to a specific environment and this determines their natural distribution.

Conceptual Scheme III 14

As a population increases, its effects on the environment become more pronounced.

Concept A 14

An area of land can support only a given number of a particular kind of organism.

Conceptual Scheme IV 16

Each individual has a role as an agent for change in the environment and, therefore, has a responsibiltiy to the environment.

Concept B 18

To actively work to save the environment an individual must understand local, state and national politics.

Concept C 20

An individual can do many things to help preserve the environment.

Concept D 22

Man's developmental planning should consider his psychological needs.

Appendices
Appendix A
Appendix B
Appendix C
Appendix D
Appendix E

CONCEPTUAL SCHEME I

ALL LIVING THINGS, INCLUDING MAN, ARE INTERRELATED AND, THEREFORE, ARE ALSO INTERDEPENDENT.

Concept A

As organisms depend upon each other the transfer of physical energy is not 100% efficient. Some physical energy is lost.

Activity 1

"The Scarlet Ibis," pages 86 - 95, Outlooks Through Literature. After reading the story, discuss the physical energy expended by both brothers.

1. Older brother expends energy to reach a performance level for his brother.
2. Doodle expends energy to please his brother questions:
   a. What effects can be expected when people expend these types of energy on each other?
   b. How do attitudes develop and change from this energy expension?

Part A

Rewrite the story (one or two pages) from Doodle's point of view, the mother's (providing she is more aware of what it is leading up to).

Part B

Give the older brother's justification of his actions.

Activity 2

Use these rewritings as basis for class discussion dealing with human ecology, how we can become more aware and understanding of other's needs, desires, etc. Have students keep a log of human awareness activities which they encounter and

Scheme I - A, B

record at the end of a day's time. Bring in log for discussion at end of week's time.

EXAMPLE

Date

Time

Place

Responded angrily at mother for accusations made, etc.

Behavior	Attitudes	Changes	Results

Activity 3

Follow the log with individualized posters of words and pictures for various feelings. Make a collage showing one of the following:

1. cause effect
2. changing attitudes
3. behavior patterns

Concept B

In the ecosystem (the system of life) when too many species become extinct, or too many forests, marshes or mangroves are removed, or too much pollution is produced, hindering the living links, the ecosystem is made less efficient or stable, and ultimately runs the risk of breaking down. Remember, man is only one of the meshes in the net, and, while he has the ability to do some repair work, he alone cannot control the workings of the system.

Scheme 1 - B

Based on the above introduction, a study of the mangrove system may be devised for a library tools activity.

Estuarine food webs in South Florida are dependent on mangroves.

Activity 1

Students are to locate information from sources in the library. Encyclopedias, Nature Magazines, Ecology Books, Specific Books on Mangroves.

1. Mangrove Island - by Marjory Bartlett Sanger, Vero Beach Junior High School Library FS 574.9

2. The Mangrove Coast - by Karl A. Bickel, Vero Beach Junior High School Library B 917.59

Have students study a mangrove system. Materials to help them study this system are available from the Freshwater Fish and Game Commission, Bryant Building, Tallahassee, Florida 32304.

List of questions to be researched are as follows. An oral presentation will follow the days used in researching. Questions for students, see Appendix A and B.

1. What goes into the system in terms of energy and nutrients? (Energy from the sun and run-off from the land adds nutrients.)

2. What comes out? (Organic molecules that can be used for food by other organisms.)

3. What does man harvest from the mangrove system? (Fish, shrimp, crabs, etc.)

4. What animals and plants depend on the mangrove system? (Fish, crustaceans, birds, mammals, many species of algae, uncounted species of microscopic organisms, etc.)

5. How productive is the mangrove system compared to a residential section? (Many-fold more productive.) To cattle grazing land? (Mangroves are more productive.) To crop growing land? (Mangroves are more productive than most crops.)

6. How does man destroy the mangrove system? (Dredge and fill and crowding it with his developments and their wastes.)

7. How long will it take man to restore the mangrove system when he has completely destroyed it? (Not possible to completely restore it.)

8. How much is an acre of mangrove in its natural state worth? ($35,000 per acre per year.) How much is it worth when it is sold? (Approximately $20,000.)

9. What kind of laws do we have to protect the mangroves? (Bulkhead lines, but none of any real worth.)

10. How do mangroves protect us during a hurricane? (Their densely intertwined roots and branches break up the force of the wind and waves and slow the storm tide.)

11. What will South Florida be like without mangroves?

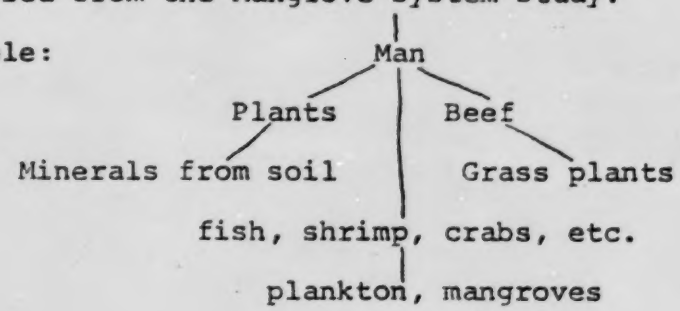
12. What happens to the land when mangroves are removed? (The land becomes subject to erosion.)

See additional research questions on following pages.

Activity 2

Students make Food Web Mobiles using the information gathered from the Mangrove System Study.

Example:



Activity 3

Show the film "The Birth of a Florida Key" (if available) and/or "Pelican Island," available in Indian River County Media Center. Relate these films to the concept through class discussion.

Scheme I - C

Concept C

Organisms need an effective system of communication.

Activity 1

Story - "Have You Ever Seen a Dancing Bee?" by Wallace Croatman in Vanguard, page 269.

Have each student write down a fairly long sentence on an ecological topic. Collect the sentences. Select six or seven of the most difficult to communicate. Give one sentence to the first person in each row. If you have a short row, combine rows to have at least four people per row. Have the first person whisper the message to the person behind him and so on down the row. Have the student at the end of the row repeat aloud the message he has heard. Then have just one sentence begin with the first person in the first row and continue throughout the entire class, from student to student. The last student to hear the message should repeat what he/she has heard. Tie in with how important it is for animals (including humans) to have an effective communication system.

CONCEPTUAL SCHEME II

HEREDITY AND ENVIRONMENT INTERACT TO DETERMINE THE CHARACTERISTICS OF AN ORGANISM AND, THEREFORE, A POPULATION.

Concept A

Organisms have different adaptations to meet different feeding habits.

Use Scholastic Scope October 10, 1974 issue, "Survive the Savage Sea." (It can be used for all levels.) Read the story aloud.

Activity 1

Given a list of 1. words (roots), 2. prefixes, 3. suffixes; have students define each, then combine to make new word finds and provide definitions. The new words would not have to be real words. For example: un means not, so undinghy is not a dinghy.

Make up questions using the definition. Answers would consist of the new words. For instance: What is not a boat?

Answer: an undinghy

Words:

Rocket flares	Dinghy
Anchor	Environ
Oars	Fluctuate
Downwind	Habitat
Doldrums	Dependent
Raft	Temper
Seasick	Rescue

Add to the list words from the story or other words associated with the environment.

Scheme II - B

Concept B

Each organism is adapted to a specific environment and will compete with other creatures in the habitat.

Activity 1

Read the story "Polar Bear - King of the Arctic," page 188 in Voices 1 (Ginn and Company, Massachusetts, 1972).

Fill in an outline similar to the one below to see a polar bear's adaptation to his environment. See Appendix C for student outline.

I. Adapted to water.

- A. Air spaces in fur
- B. Oil glands in skin
- C. Thick layer of fat
- D. Legs jointed for swimming
- E. Webbed toes
- F. Hair on bottom of feet

II. Adapted to hunting

- A. Unretractable claws
- B. Silent movement
- C. Nose covering instinct
- D. Sense of smell
- E. Intelligence

III. Adapted in other ways

- A. Parenthood in the North
- B. Third eyelid for vision protection
- C. Captivity in zoos

IV. Endangered

- A. International animal
- B. Three mile limit
- C. Destruction in seal industry
- D. Excellent price for zoo animals and skins

Activity 2

Read "In the Dark" (Voices 1, Ginn and Company, Massachusetts, 1972) and make a series of drawings or clipped pictures of the enemies of the drake. Use the pictures to tell the story orally.

Activity 3

Following the above assignment, reading in the library could be done so that students could make a set of drawings of natural enemies of a chosen wild creature.

Activity 4

Have the students either read aloud in parts, perform, or tape the play A Shipment of Mute Fate in Vanguard page 101. Bring in the ideas of survival and instinct during the course of the play.

Activity 5

In Vanguard (Glenview, Illinois: Scott Foresman and Company, 1967), read the unit Wild Ways. On page 273 is a chart of several items concerning the mannerisms of wild animals. Have the students select two of the animals they have learned about in the stories and have them fill in all of the information asked for in the chart. The students, if well-motivated, could include a picture of their animals with the chart. Some of the best could be presented orally to the class, with the illustrations displayed.

Scheme II - C

Concept C

Each organism is adapted to its environment in an endless variety of ways.

Activity 1

On page 272 in Vanguard (Scott Foresman and Company, Atlanta, 1967) read "What do you know about insects?" Show the students the pattern of the interrogative about the katydid's ears and the declarative about the ears on its elbows. In the library have them find an odd fact about an insect and make a question and statement answer to the question. Then have a day of fun exchanging the odd facts in class. Students who are interested may choose to illustrate some of the ideas.

Activity 2

Read the small poem "Something Told the Wild Geese" on page 243 in Vanguard (Scott Foresman and Company, Atlanta 1967). Give the students a choice from the following library assignments.

1. Copy a bird poem and draw a picture of the bird.
2. Collect bird poems you like.
3. Memorize and recite a bird poem you like.
4. Read factual material about a bird. Then write a simile or metaphor using the bird information

I know a person who is a _____ because _____.

I know a person who is like a _____ because _____.

I know a person who is like a mockingbird because he always imitates.

I know a person who is a raven because she likes shiny things.

Activity 3

After reading "Grass Fire" in Vanguard, Page 88, have the students write a short story involving a natural disaster (volcano, earthquake, flood, fire) and how predators and prey work together to escape or solve the problem. Animals can be main characters that speak and work together in order to survive (such as the movie Bambi). Humans can serve as main characters, working to save the animals living in the endangered area.

Concept D

The diversity of species and their adaptations to survival in specific environments result in a distribution that fills almost every available habitat and area.

Activity 1 - "Add-a-line" Stories

Take your class outdoors and have them create a nature story by allowing one person to begin telling the story. The first person gets no more than four sentences, then the next person must add to the story. Each successive student can add up to four sentences. The story should take place on the school grounds. Allow the students' imaginations to flow freely. If possible make a tape recording of the story and play it back later in the year. See Appendix D for picture.

Activity 2 - The Natural History of an Earth Species

Before giving students any further information on the activity, instruct each student to collect three (3) pieces of litter from the school grounds. Tell them they will be used for an activity in the classroom, but give them no further direction. Have them spread all three pieces before them on their desks. Now inform them that each student is a space scientist who has landed on a strange planet.

The use of a podium and microphone will aid in formalizing the presentations.

Scheme II - D

The planet is in one of its long night periods which might last many earth weeks. Observation is impossible due to darkness. Your ship's Robots have scanned the area and returned with only the three (3) pieces of litter you have before you. The three items have indicated to you that there is life on the planet. Problem: Each student should concern himself/herself with his own three pieces of litter. Assuming no more information than the litter provides, draw as many conclusions as to the size of the species; what they might look like; what they eat, drink; where they live; what is their level of intelligence; do they have eyes, and if so, would rods or cones dominate? (Color in litter indicates cones are dominant and, therefore, activity principally during daylight.) Finding a coke can might indicate many things from the types of metals on the planet, etc. What would the contents of the can be used for? Consider if all the material is from the same species or many species.

Reminder: Based on the three (3) pieces of litter you have, it would be correct to form deductions that, although logical, you know to be false.

Once you have drawn your fullest amount of deductions, based on your three pieces of litter, you are to formally present them (as if at a formal seminar) to the class, who would represent a gathering of leading scientists back on Earth. The class (scientists) will be allowed to critically challenge the deductions, and you should be prepared to support them.

Scheme II - E

Concept E

Each species is adapted to a specific environment and this determines their natural distribution.

Activity 1

Story - "Dimond of Alaska" by Edward A. Herron in Vanguard, Scott, Foresman and Company, 1967.

After having read the story, have each student make a list of situations where man must cope with his environment in order to survive. Collect the lists. From the lists, select several of the best suggestions and apply them to some of the following ideas:

1. Divide the class into groups and let each group select one of the situations from a hat. Have them write a short skit depicting the situation and a workable solution to the situaiton. These should be performed for the class.

2. Divide the class into groups and have each group select a situation. Have them compose a picture story of the situation and possible solutions on a poster.

3. Have each student select one of his own situations and have him write a short story, using the situation and explaining how the main character survived the ordeal.

4. Have each student select one of his own situations. Have him/her prepare an oral presentation on the problem and how he would solve the problem in order to survive.

CONCEPTUAL SCHEME III

AS A POPULATION INCREASES, ITS EFFECTS ON THE ENVIRONMENT BECOME MORE PRONOUNCED.

Concept A

An area of land can support only a given number of a particular kind of organism.

"By the Waters of Babylon," by Steven Vincent Benet. (Outlooks through Literature, Glenview, Illinois, Scott, Foresman, 1968, pp. 120-129).

Man must control his knowledge or that knowledge will destroy him.

What if man's knowledge will finally destroy the environment?

Activity 1

Use current news items. Write a short composition exploring the possibilities of man "eating knowledge too fast," thus not digesting methods to cope with the knowledge.

a. Automobiles - air pollution
b. Aerosol sprays - ozone layer
c. Fuel - energy shortages
d. Population boom
e. Medicines (drugs)

Based on Text questions p. 129, Numbers 5,6

Teacher's Resource Book

Activity 2

Use items particular to Indian River County; build paragraphs; include a topic sentence, body sentences,

Scheme III - A

and a concluding sentence. Research the item in some way using books, magazines, newspapers, personal observation, etc.

1. Sewage treatment plant
   Population increase - effect on environment
2. Littering
3. Sanitary Landfills
4. Recycling
5. Parks
6. Septic tanks and drain fields
7. Public health
8. Agricultural runoff - sprays - fertilizers - pesticides which, after a rainfall, runoff into lakes, rivers, ocean, etc.
9. Beaches
10. Canals, ditches

CONCEPTUAL SCHEME IV

EACH INDIVIDUAL HAS A ROLE AS AN AGENT FOR CHANGE IN THE ENVIRONMENT AND, THEREFORE, HAS A RESPONSIBILITY TO THE ENVIRONMENT.

Concept A

Man is the sole organism that can consciously modify his environment.

Activity 1 - Vocabulary

Given the following list of words, students are to locate definitions relating to ecology . A Dictionary of Ecology is available in the Vero Beach Junior High School Library

Ecosystem	Recreation
Land usage	Ecology
Population	Community
Environment	Utilization
Contamination	Zone
Recycling	Systematics
Transportation (in soil erosion)	Species
Public service	Organism

Use the above list to build awareness of ecological terms.

Activity 2

From the above list of terms build 1. Crossword puzzles, 2. Wordfind puzzles, 3. Scrambled words, 4. Magic squares games for students. (You may wish to use only a few of the games.) These games serve as learning aids and/or reviews for the terms. See Appendix E for words, definitions, games, puzzles and answers.

Scheme IV - A

Activity 3

For the poem "Four Little Foxes" (Ginn and Company, Massachusetts, 1972) use the following or another plan for a choral reading. All girls read the first line of each stanza. A boy reads the two center lines of each stanza as a solo. All boys read the fourth line in unison.

Then lead the youngsters in a discussion of experiences with wild creatures, both pleasurable and abusive, they have observed. If desired it could be carried on to a writing assignment on the pleasant memory or the need for correction.

Activity 4

After reading "All Summer in a Day" (Voices 1, Ginn and Company, Massachusetts, 1972), have the students picture themselves on a far planet. Collect pictures of scenes they feel they would miss most. After the collections are made, lead the class to draw conclusions about actions that must be made now so that grandchildren can see some of these things.

Scheme IV - B

Concept B

To actively work to save the environment an individual must understand local, state and national politics.

Activity 1 - Letter writing

Have students write a letter to a Congressman, a Senator and to a U. S. Senator and a U. S. Representative. Ask them to send information to you regarding their specific level of government.

Have students choose an ecological issue, devise a set of questions on that issue and incorporate them into a letter to a government official.

Suggested questions:

1. Should dredging and filling be halted?
2. Should Sanctuaries be saved?
3. How would you go about saving a sanctuary?
4. After it has been saved, what would you use it for?
5. What efforts on your part have been initiated to save the Everglades, Big Cypress, Mangroves and other unique habitats?
6. What legislation(s) or committee(s) have you personally supported and/or participated on which are ecologically minded?

Other questions may be included from class suggestions or those of the teacher.

If any of the letters are answered, a display of them could be used on an ecology bulletin board.

Scheme IV - B

Activity 2

Small groups of students should attend a local session of the City Council or County Commission over a period of time. They should write reports of each meeting and discuss them with the class or publish them in the school newspaper.

Scheme IV - C

Concept C

An individual can do many things to help preserve the environment.

Activity 1

Show filmstrip relating to the environmental crisis. (Found in Junior High School Media Center.) The Ecological Crisis, C797-3 Some Ecological Considerations, C797-6 Pollution.

Using the heading, Don't Just Stand There, Do Something have students make up a list of items which they could do individually to help conserve the environment. Here are a few suggested items which the teacher may include as general information or use later in class discussions.

1. Save water.
2. Turn lights out.
3. Walk or bicycle more often.
4. Buy beverages in returnable containers.
5. Pick up more than just your own litter.
6. Use both sides of paper for unspecified assignments, letters, recipes, games, etc.
7. Decline excess packaging.
8. Set air-conditioner higher.
9. Don't molest wildlife.
10. Don't plan toward large families.
11. Be conscious of neighboring animals, especially if they begin to diminish.
12. Be aware of conservation agencies in your areas.
13. Form/join awareness groups:
    a. Audubon

Scheme IV - C

b. National Wildlife Federation
c. Conservation
d. Sierra Club
e. Vero Beach Junior High Ecology Club
f. Citizens Action Against Pollution

Ask students to list two specific steps their household could easily do to ease environmental degradation.

Activity 2

In the form of cartoons, have the students draw a series of pictures showing man in the midst of doing something worthwhile to save some aspect of his environment. The ideas for the pictures may come from the above lists or others, which students have included. Each student should draw at least five different ideas. The cartoons then may be transferred to transparencies, slides, enlarged for bulletin boards or three-dimensional minatures.

Concept D

Man's developmental planning should consider his psychological needs.

Activity 1

After reading A Tale of Two Cities, pages 466-600, Outlooks Through Literature, Scott Foresman and Company, Atlanta, 1967, and discussing physical and psychological needs of the following characters:

Mr. Lorry, Lucie Manette, Doctor Manette, Jerry Cruncher, Charles Darnay, Sydney Carton, Madame Defarge, Monsieur Defarge, Miss Pross, Joh Barsad (Salomon) and others,

have students relate their needs using the Student Activity Sheet.

Because of the personal nature of the questions, it is a good idea to collect forms (without names on them)and then go over the answers.

Scheme IV - D

Student Activity Sheet

See if you can think of six (6) things that you need or must have to feel important and good:

1.
2.
3.
4.
5.
6.

How many of these needs do not involve your physical body? (List) The needs which do not directly affect you physically, can affect you psychologically. Psychological needs are usually fulfilled by how others treat us. Psychology is also what, why, and how we think, as well as how we feel about ourselves and our relationships to the surroundings and people near us.

Most people need to feel secure. Security means being free from impending fear or disaster. Can you think of anything in the environment, or things that others do to make you feel insecure? List some.

1.
2.
3.

People, such as you and I, also have a need to be accepted by others. We need to feel that there are others who really care about us and our life. In short, we need to know we are loved.

People also have another need; to feel like they are accomplishing something. We need to feel that there is a reason for us to be existing and that we are fulfilling that reason. Some people are more successful that others, and this

is probably due to their need to be that way.

In almost all our cases, our physical needs have been met, however, due to the economics of meeting them, some psychological needs may have been neglected.

Our economical and social way of living makes it extremely easy to forget psychological needs of others.

With such a large population it is oftentimes difficult for an individual to believe that he is important, or that his life might make a difference.

This dehumanizing process is all around us. Some people escape it, other do not.

Name things that happen to you in school or out that you consider dehumanizing or make you feel like an unimportant being.

1.
2.
3.
4.
5.

Think about things you could do to meet your own and other peoples psychological needs. List some of them.

1.
2.
3.

Appendix A

Questions (without answers) from previous pages.

1. What goes into the system in terms of energy and nutrients?
2. What comes out?
3. What does man harvest from the mangrove system?
4. What animals and plants depend on the mangrove system?
5. How productive is the mangrove system compared to a residential section? To cattle grazing land? To crop growing land?
6. How does man destroy the mangrove system?
7. How long will it take man to restore the mangrove system when he has completely destroyed it?
8. How much is an acre of mangrove in its natural state worth? How much is it worth when it is sold?
9. What kind of laws do we have to protect the mangrove?
10. How do mangroves protect us during a hurricane?
11. What will South Florida be like without mangroves?
12. What happens to the land when mangroves are removed?

Appendix B

A second topic of research involves the ecology of an estuary. (Our Indian River is an estuary).

Following are questions to be researched:

1. What is an estuary?
2. Why is an estuary so important to the development of many organisms?
3. What can be done to prevent or limit building in these areas?
4. What are the rights of individuals or corporations to whom these areas belong?
5. Do these people have the responsibility to consider the effects of their ventures on the environment? How should they express this responsibility?
6. How do we choose which wetlands to preserve and which to develop in response to the needs of an expanding population? List specific criteria that should be used in making a determination.

Scheme II - B

Appendix C

The Polar Bear

I. Adapted to water

A.
B.
C.
D.
E.
F.

II. Adapted to hunting

A.
B.
C.
D.
E.

III. Adapted in other ways

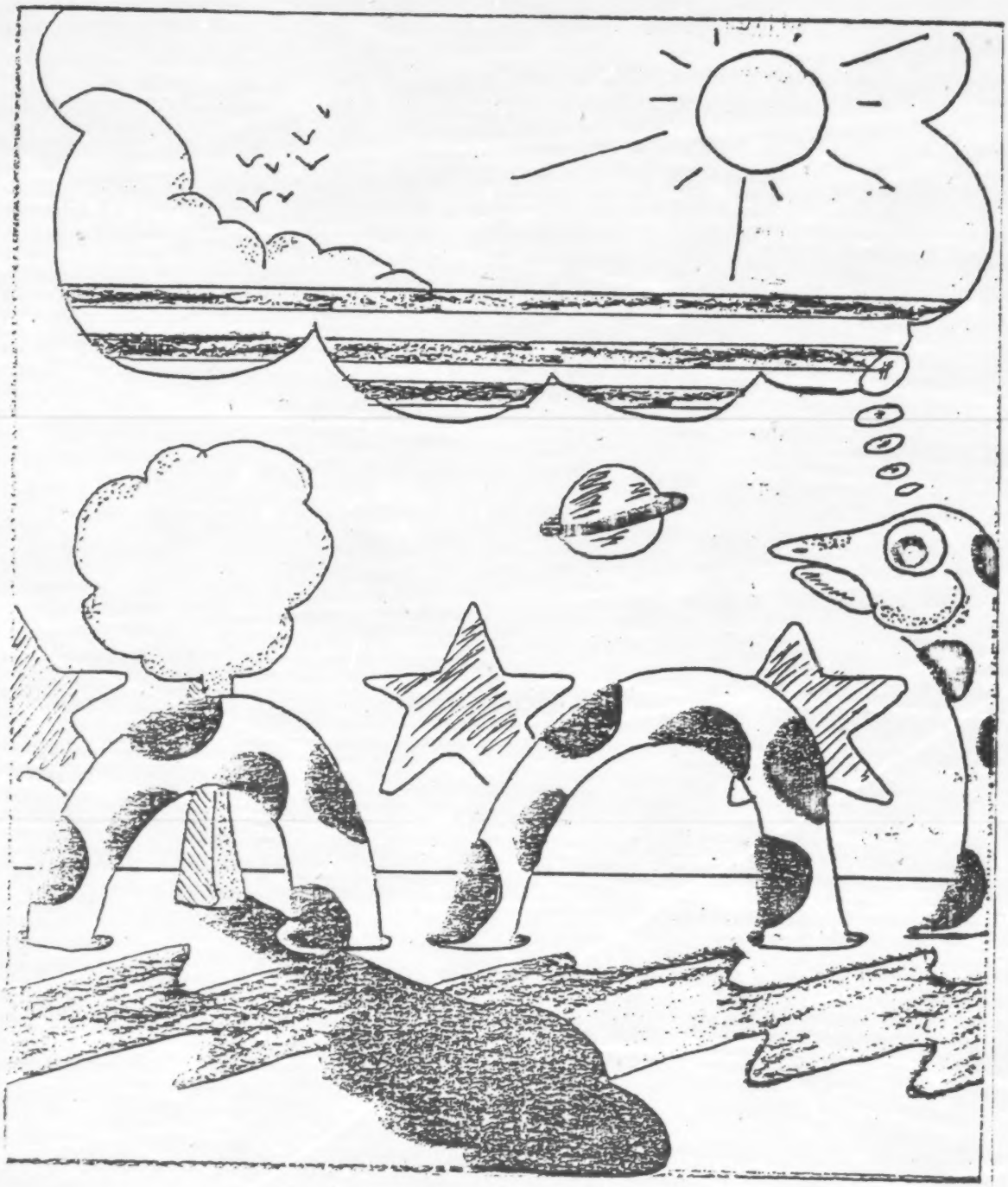
A.
B.
C.

IV. Endangered

A.
B.
C.
D.

Scheme II - D

Appendix D



Appendix E

Vocabulary words and definitions:

environment- the sum total of all external influences affecting an organism.

land usage - the way in which man uses land.

contamination - a soiling, staining, or infecting by contact or association.

transportation - movement of detached particles or masses of soil across the land or through the air by wind, water or gravity.

public service - the business of supplying some commodity or service to members of a community.

recreation - a means of refreshment, restoration or diversion.

ecology - the study of relationships between living organisms and their environment.

species - a unit of classification of plants and animals.

utilization - act of making use of.

ecosystem - a community including all component organisms with the abiotic environment, eg. a marsh.

zone - a more or less well marked vegetation belt of a fairly uniform appearance.

organism - an individual constituted to carry on the activities of life by means of organs separate in function but mutually dependent.

systematics - the science of classification.

population - a group of interacting individuals of the same species.

recycling - causing to go through successions again.

community - a group of one or more populations of plants and animals in a common spatial arrangement.

Scheme IV - A

Crosswood Puzzle

Across

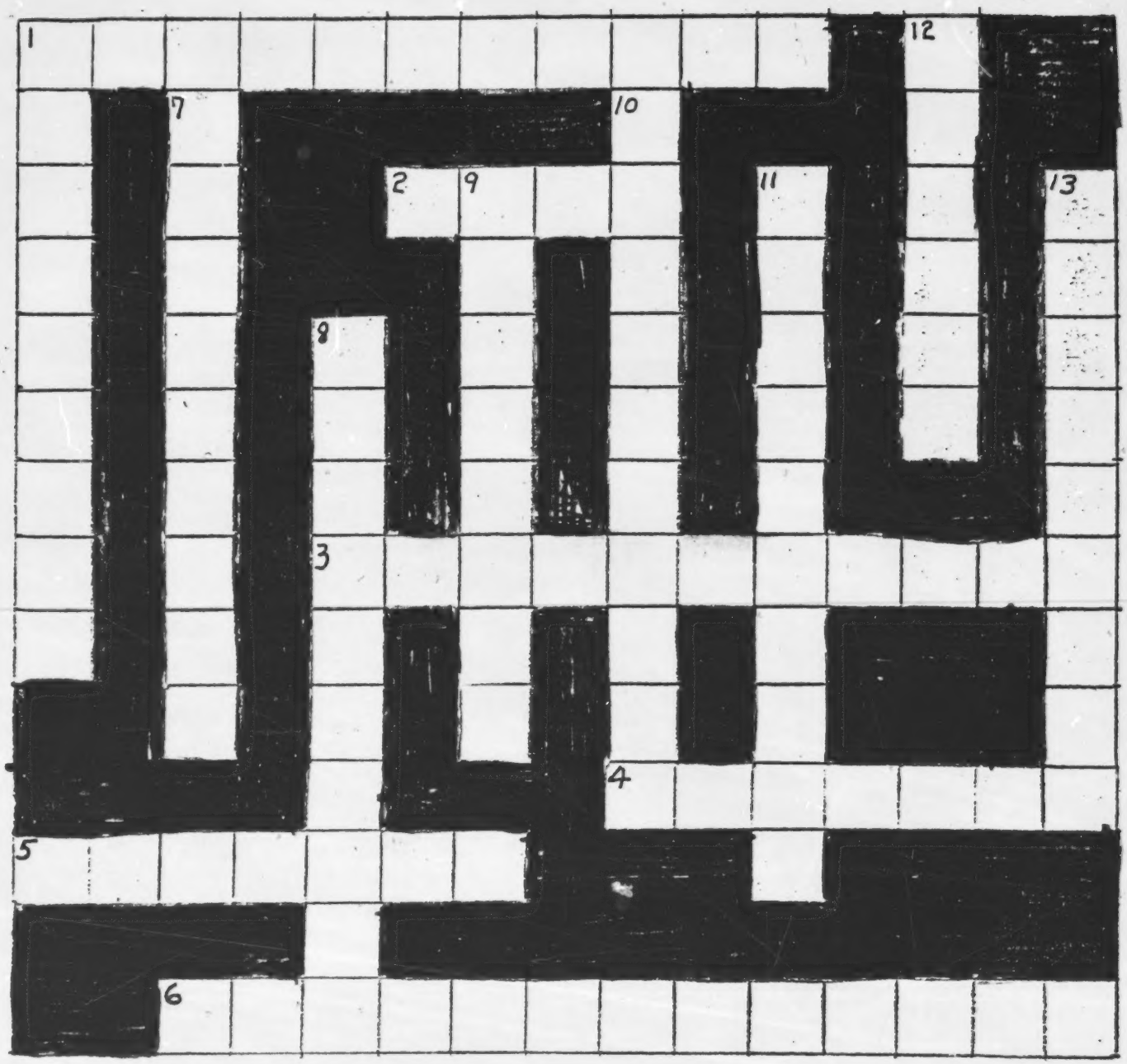
1. the sum total of all external influences affecting an organism
2. a more or less well marked vegetation belt of a fairly uniform appearance
3. act of making use of
4. the study of relationships between living organisms and their environment
5. a unit of classification of plants and animals
6. a soiling, staining, or infecting by contact or association

Down

1. a community including all component organisms with the abiotic environment, e.g. a marsh
7. the act of moving detached particles or masses of soil across the land through the air by wind, water, or gravity
8. a group of interacting individuals of the same species
9. an individual constituted to carry on the activities of life by means of organs separate in function but mutually dependent
10. causing to go through succession again
11. a means of refreshment, restoration, or diversion
12. _____ service; the business of supplying some commodity or service to members of a community
13. a group of one or more populations of plants and animals in a common spatial arrangement

Scheme IV - A

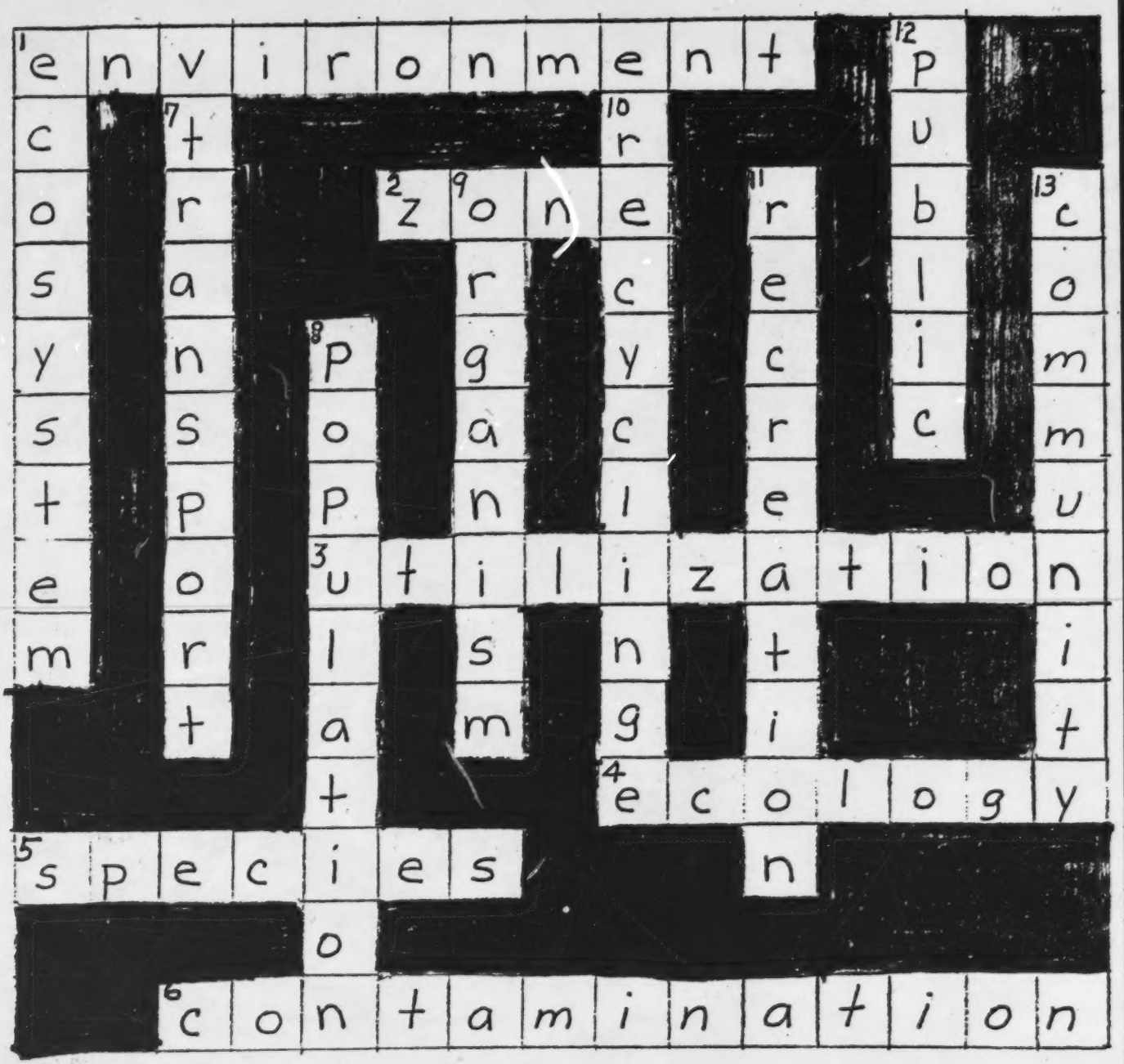
CROSSWOOD PUZZLE



E-3

Scheme IV - A

CROSSWOOD PUZZLE


1 environment
12 p
7 t
10 r
u
2 z 9 o n e 11 r b 13 c
r c l o
a r c e
y n p g y c i m
s s o a c r c m
t p p n l e u
e o 3 u t i l i z a t i o n
m r l s n t i
t a m g i t
t e 4 e c o l o g y
5 s p e c i e s n
o
6 c o n t a m i n a t i o n

Scheme IV - A

WORD FIND 1

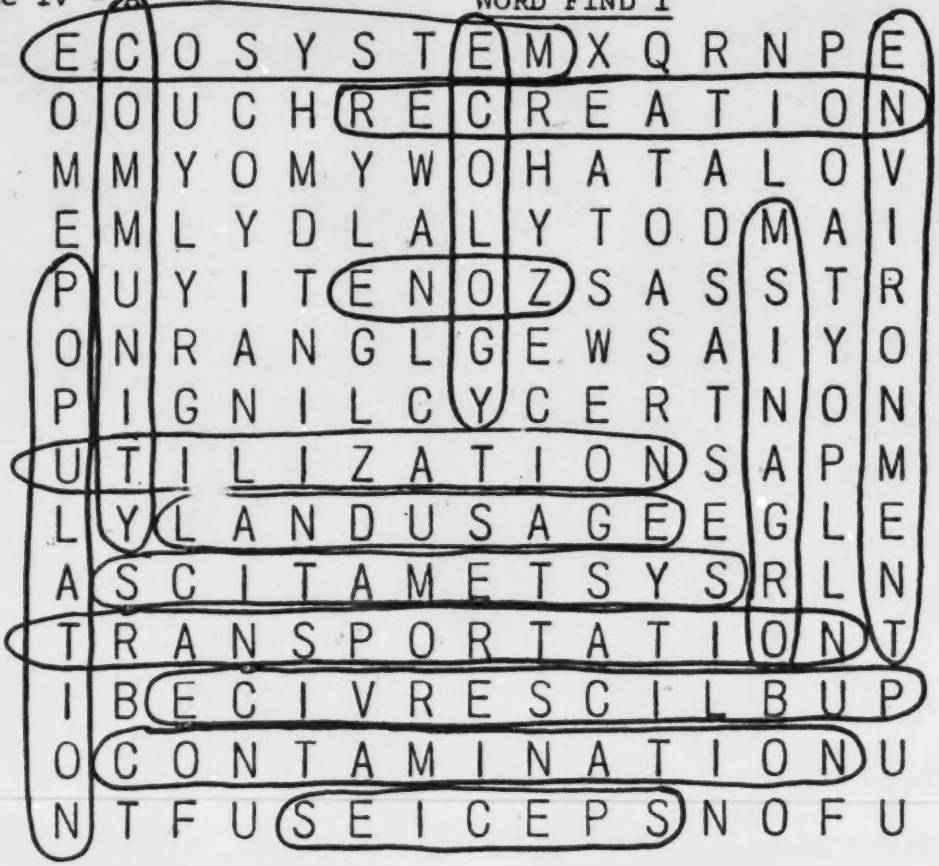
E C O S Y S T E M X Q R N P E
O O U C H R E C R E A T I O N
M M Y O M Y W O H A T A L O V
E M L Y D L A L Y T O D M A I
P U Y I T E N O Z S A S S T R
O N R A N G L G E W S A I Y O
P I G N I L C Y C E R T N O N
U T I L I Z A T I O N S A P M
L Y L A N D U S A G E E G L E
A S C I T A M E T S Y S R L N
T R A N S P O R T A T I O N T
I B E C I V R E S C I L B U P
O C O N T A M I N A T I O N U
N T F U S E I C E P S N O F U

The following words can be located in the above puzzle by looking vertically and horizontally.

ecosystem
land usage
population
environment
contamination
recycling
transportation
public service
recreation
ecology
community
utilization
zone
systematics
species
organism

Scheme IV - A

WORD FIND 1


E C O S Y S T E M X Q R N P E
O O U C H R E C R E A T I O N
M M Y O M Y W O H A T A L O V
E M L Y D L A L Y T O D M A I
P U Y I T E N O Z S A S S T R
O N R A N G L G E W S A I Y O
P I G N I L C Y C E R T N O N
U T I L I Z A T I O N S A P M
L Y L A N D U S A G E E G L E
A S C I T A M E T S Y S R L N
T R A N S P O R T A T I O N T
I B E C I V R E S C I L B U P
O C O N T A M I N A T I O N U
N T F U S E I C E P S N O F U

The following words can be located in the above puzzle by looking vertically and horizontally.

ecosystem
land usage
population
environment
contamination
recycling
transportation
public service
recreation
ecology
community
utilization
zone
systematics
species
organism

Scheme IV - A

WORD FIND 2

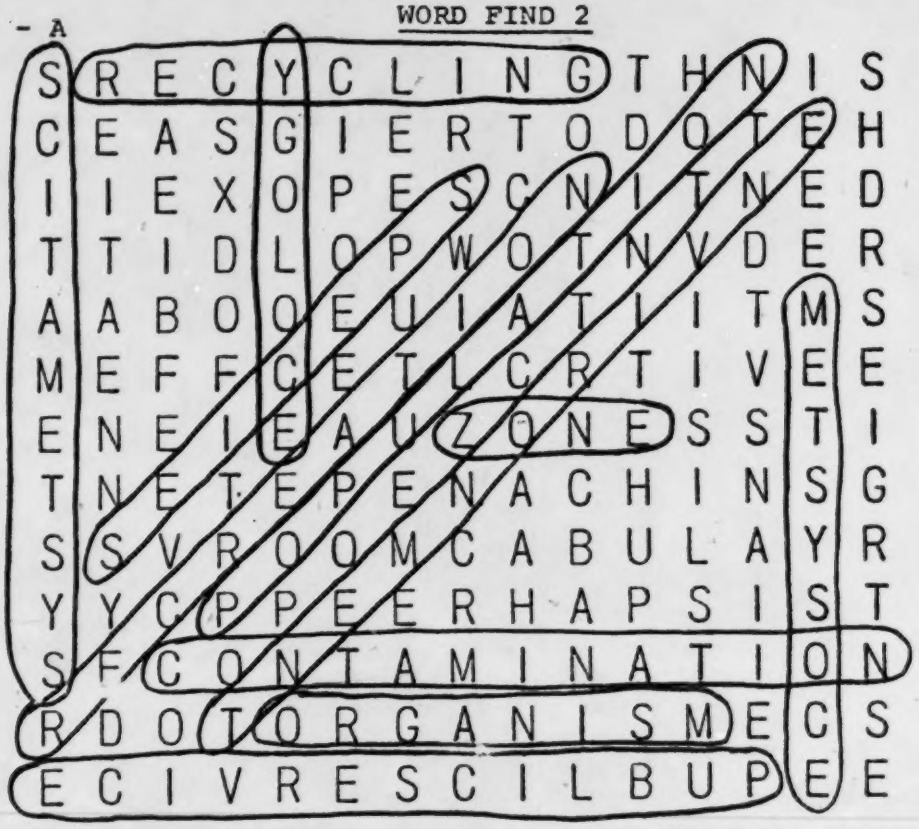
S R E C Y C L I N G T H N I S
C E A S G I E R T O D O T E H
I I E X O P E S C N I T N E D
T T I D L O P W O T N V D E R
A A B O O E U I A T I I T M S
M E F F C E T L C R T I V E E
E N E I E A U Z O N E S S T I
T N E T E P E N A C H I N S G
S S V R O O M C A B U L A Y R
Y Y C P P E E R H A P S I S T
S E C O N T A M I N A T I O N
R D O T O R G A N I S M E C S
E C I V R E S C I L B U P E E

The words in the puzzle may be found vertically, horizontally, diagonally, backward, and forward. Circle the words.

ecosystem
land usage
population
environment
contamination
recycling
transportation
public service
recreation
ecology
community
utilization
zone
systematics
species
organism

Scheme IV - A

WORD FIND 2


S R E C Y C L I N G T H N I S
C E A S G I E R T O D O T E H
I I E X O P E S C N I T N E D
T T I D L O P W O T N V D E R
A A B O O E U I A T I I T M S
M E F F C E T L C R T I V E E
E N E I E A U Z O N E S S T I
T N E T E P E N A C H I N S G
S S V R O O M C A B U L A Y R
Y Y C P P E E R H A P S I S T
S F C O N T A M I N A T I O N
R D O T O R G A N I S M E C S
E C I V R E S C I L B U P E E

The words in the puzzle may be found vertically, horizontally, diagonally, backward, and forward. Circle the words.

ecosystem
land usage
population
environment
contamination
recycling
transportation
public service
recreation
ecology
community
utilization
zone
systematics
species
organism

Word Scramble 1

1. Y S S T O E C M E _____
2. N P O O I P T U A L _____
3. O N C O T I N T N A A M I _____
4. S P O R T N A R T N O I T A _____
5. N I A R E O T E C R _____
6. M M I N U O T Y C _____
7. N O Z E _____
8. S E I C E P S _____

Word Scramble 2

1. R S M O G I N A _____
2. S S C Y I S T T A E M _____
3. U T I N O I L I T A Z _____
4. E O O Y G L C _____
5. S E R L I C P U B V I C E _____
6. L C C Y R G E N I _____
7. T E N N E V M I N R O _____
8. D U S E N L A G A _____

Scheme IV - A

Magic Square 1

If you match the numbered definitions to the lettered terms by writing the number of the definition in the correct lettered square, the sum of any three numbers in a straight line will be fifteen.

A. land usage

B. environment

C. contamination

D. transportation

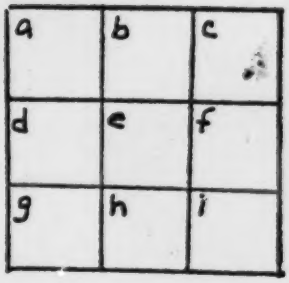
E. public service

F. recreation

G. ecology

H. species

I. utilization



1. the sum total of all external influences affecting an organism
2. act of making use of
3. movement of detached particles or masses of soil across the land or through the air by wind, water, or gravity
4. the study of relationships between living organisms and their environment.
5. the business of supplying some commodity or service to members of a community.
6. a soiling, staining, or infecting by contact or association
7. a means of refreshment, restoration or diversion
8. the way in which man uses land
9. a unit of classification of plants and animals.

Magic Square 2

If you match the numbered definitions to the lettered terms by writing the number of the definition in the correct lettered square, the sum of any three numbers in a straight line will be 15.

A. ecosystem

B. zone

C. environment

D. organism

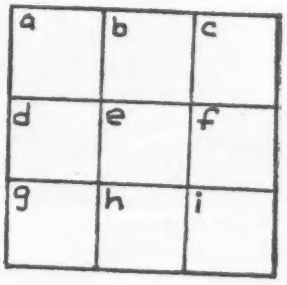
E. species

F. systematics

G. population

H. recycling

I. ecology



1. causing to go through successions again.
2. a community including all component organisms with the abiotic environment, e.g. a marsh
3. the science of classification
4. the sum total of all external influences affecting an organism
5. a single, distinct kind of plant or animal
6. a group of interacting individuals of the same species
7. an individual constituted to carry on the activities of life by means of organs separate in function but mutually dependent.

Word Scramble 1

1. Y S S T O E C M E	ecosystem
2. N P O O I P T U A L	population
3. O N C O T I N T N A A M I	contamination
4. S P O R T N A R T N O I T A	transportation
5. N I A R E O T E C R	recreation
6. M M I N U O T Y C	community
7. N O Z E	zone
8. S E I C E P S	species

Word Scramble 2

1. R S M O G I N A	organism
2. S S C Y I S T T A E M	systematics
3. U T I N O I L I T A Z	utilization
4. E O O Y G L C	ecology
5. S E R L I C P U B V I C E	public service
6. L C C Y R G E N I	recycling
7. T E N N E V M I N R O	environment
8. D U S E N L A G A	land usage

Magic Square

Answers

1.

a 8	b 1	c 6
d 3	e 5	f 7
g 4	h 9	i 2

2.

a 2	b 9	c 4
d 7	e 5	f 3
g 6	h 1	i 8